A Prospectus for Participation by Foreign Governments in ***FutureGen***

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Introduction

The electricity and transportation sectors are responsible for more than half of worldwide anthropogenic carbon dioxide emissions from fossil fuel use. To significantly reduce these emissions and to preserve the security and cost benefits of using fossil fuels, the engineering, economic, and environmental viability of fossil-based energy systems with zero emissions must be validated.

On February 27, 2003, President Bush announced that the United States would sponsor a nominally one billion U.S. dollars, 10-year research project to build the world's first coal-fueled plant to produce electricity and hydrogen with zero emissions. In response to this announcement, Secretary of Energy Spencer Abraham unveiled plans for FutureGen – a bold step toward defining a key pathway to meet the climate challenge. The FutureGen plant will establish the technical and economic feasibility of producing electricity and hydrogen from coal –- a low-cost and abundant energy resource –- while capturing and storing the carbon dioxide generated in the process.

An Invitation to Participate

Gaining worldwide acceptance of the concept of sequestration is a key goal of our Carbon Capture and Storage Initiative of which the FutureGen, while a separately operated program, project is an important component. Thus, the U.S. Department of Energy is inviting international involvement in this project. This prospectus provides a framework for foreign governmental agencies to join with the Department in undertaking FutureGen. It outlines the:

- FutureGen project
- Benefits of international participation
- Participation mechanisms for non-U.S. entities

Forms of Participation

Opportunities for international participation in FutureGen can be at various levels and take on several forms, such as:

- Government to Government cooperation including participation on Government Steering Committee through cost-sharing
- Membership of foreign coal producers and coal-fueled electric utilities in the Consortium subject to terms and conditions of the Consortium
- Open and fair competitive opportunities for equipment vendors and engineering services to bid on FutureGen procurements
- Academic scientists and researchers participation in FutureGen testing

What is FutureGen?

FutureGen is a large-scale research project that will result in a first-of-a-kind energy plant that showcases the best technology options for using coal to produce electricity and hydrogen with zero emissions. The Department envisions the plant will employ coal gasification technology and be nominally sized to produce 275 MW equivalent gross electricity output. The large scale of the FutureGen plant is driven by the need to adequately validate the engineering, economic, and environmental viability of coal-based, zero emissions technologies.

Power generation and hydrogen production will be integrated with the capture of carbon dioxide and its storage in deep, stable underground geologic formation(s). FutureGen will seek to sequester carbon dioxide emissions at an operating rate of one million metric tons per year in order to adequately stress test a representative portion of a geologic formation. The plant will also meet stringent limits on all other environmental emissions associated with coal use. Thus, the plant will showcase the capability of technology to virtually eliminate environmental concerns associated with the use of coal.

The initial FutureGen plant configuration will incorporate cutting edge technologies to address scaling and integration issues for coal-based, zero emissions energy plants. The plant will be operated as a research facility – it will test and validate additional advanced technologies as they emerge from research programs. These advanced technologies will offer the promise of clean environmental performance, at a reduced cost and increased reliability. Thus, FutureGen will be designed and constructed with the flexibility to conduct both full scale and slipstream tests of such scalable advanced technology over the entire operational phase of the project.

How is FutureGen Being Implemented?

The ultimate success of FutureGen depends on acceptance of the concept of carbon capture and storage by the industries that will be most heavily impacted by potential future limitations on carbon emissions. Thus, the U.S. Department of Energy plans to enter into a cooperative agreement with a Consortium led by the coal-fired electric power industry and the coal production industry. This Consortium will be responsible for the design, construction, and operation of the FutureGen plant; and, for the monitoring, measurement, and verification of carbon dioxide sequestration from the plant. However, the Department anticipates it will provide an independent validation of carbon dioxide capture and storage for the FutureGen project. The Consortium is expected to contribute about two hundred and fifty million U.S. dollars in industry cost share towards the estimated nine hundred and fifty million U.S. dollars (in 2004 dollars) total project cost.

The initial Consortium membership is expected to collectively own and produce one-third of U.S. coal and one-fifth of U.S. coal-fueled electricity. However, the U.S. Department of Energy expects the Consortium to be an “open” consortium – working to expand its initial membership to one that includes other interested coal producers and coal-fueled electricity generators in both the United

States and abroad. Terms and conditions for inclusion of these additional entities will be determined by the Consortium. The Department expects the Consortium to encourage and provide mechanisms for future participation in the project, as appropriate, by interested parties including state and local governments, regulators, and the environmental community. It is envisioned that the Consortium will structure several levels of participation in FutureGen activities for these parties and identify benefits and cost-sharing as appropriate.

The Consortium will use a fair and open competition to select a host site in the United States. It will also use a fair and open competition to select engineering, design, and construction services, and major equipment modules. The mechanism for foreign (and domestic) equipment and service vendors to participate in FutureGen is through this competitive selection process for their goods and services.

What is the Government Steering Committee?

The U.S. Department of Energy envisions that a Government Steering Committee (GSC) will be a group of officials from the U.S. Government and participating foreign governments. The GCS's role is to provide guidance and input to the Department of Energy with respect to the design and requirements of the research and testing program for FutureGen. The level of cost-sharing by a foreign government will determine the degree of involvement in the Steering Committee process. The Committee will be chaired by a representative from the U.S. Department of Energy. U.S. government representation would also include additional officials from the U.S. Department of Energy and other agencies. Requirements for foreign government membership are described in the next section.

The Government Steering Committee will have the opportunity to review, advise, and influence the requirements and scope of research that FutureGen is expected to address to achieve the test objectives. Under the guidance of the Department's contracting officials, it will have the opportunity to participate in the review process of overarching key/major milestones; and propose cost-effective options, provide input, information and lessons learned based on prior experience for consideration by Departmental officials in making decisions on project features including:

- Functional and design requirements of the FutureGen plant with respect to meeting the research and test objectives
- Test plan for the operational period
- Sequestration protocol
- Monitoring plan for sequestration

The Government Steering Committee will have the opportunity to:

- suggest adding new coal and utility members to the Consortium,
- suggest involving other interested parties in Consortium activities,

- make non-proprietary performance data publicly available so interested parties can evaluate the viability of coal-fueled, zero emissions energy plants

In addition, members of the Government Steering Committee will have the opportunity to nominate:

- Government and academic scientists and researchers from their country to participate on technical subcommittees that review the testing aspects of the project under terms and conditions determined by the Consortium
- Advanced technologies to be supplied by a government participant for slip stream or full size demonstration, validation, and testing at the FutureGen facility depending on the amount of cost-sharing provided
- Coals from their country for testing at the FutureGen facility

How Can Foreign Governmental Agencies Participate?

This Prospectus invites foreign governmental agencies to participate in FutureGen. The U.S. Department of Energy's vision is that all major coal producing or consuming countries will participate. The mechanism for participation is through membership on the Government Steering Committee.

A variety of mechanisms exist for foreign government organizations to formalize their participation in FutureGen. Existing modified, or new bilateral agreements on cooperation between an interested country and the U.S. Department of Energy, or possibly another U.S. government agency, could provide a vehicle for foreign government organizations to participate in FutureGen. Similarly, agreements between the United States and multilateral organizations, such as the International Energy Agency (IEA) and the European Commission (EC), could be used. The IEA's Greenhouse Gas R&D Programme is an example of an existing multilateral agreement that might be used.

A foreign government can terminate its membership on the Government Steering Committee at any time by notifying the Chairperson in writing. At such time, all benefits from participating in FutureGen will cease and any portion of previous contributions will not be returned.

What are the Benefits to Foreign Governmental Agencies?

A key benefit of participation in FutureGen is timely access to data from the world's first large-scale, integrated, zero emissions test facility. This data is needed to support future policy and regulatory decisions concerning climate change. Membership on the Government Steering Committee will provide a "seat at the table" while definitive cost, performance, and environmental data for carbon capture, transport, and storage are developed, and technology standards and protocols to measure, monitor, and verify carbon dioxide capture and storage are established.

FutureGen will also provide other important overarching benefits to each of the participating nations.

- It will leverage each nation's investment in research. Collaborative research and development led by a broad cross section of world leaders in the coal and power industries is the most cost-effective approach to test and validate coal-fired, zero emissions technologies.

- It will provide the opportunity to test its advanced technology and/or coal fuels at the FutureGen facility.

- The nations participating in annual cost-sharing will have the opportunity to gain first hand knowledge of the design rationale and operating experience from a first–of-a-kind integrated facility leading to a conceptual design of a similar class plant for that nation. This knowledge can provide the design basis and operating parameters for replication of – or improvements to – follow-on integrated plants by the participating nation in its own country, or elsewhere in the world.

- It will provide affordable technological solutions to climate change on an accelerated schedule. International collaborative research accelerates technology development and acceptance by capitalizing on expertise from around the world. Affordable energy solutions have positive impacts on the economies of nations.
- The sharing of any net revenues from plant operations will be computed by a formula based on a proportionality of the monetary cost-sharing, and the start date of participation

How Can Non-U.S. Based Industrial Organizations Participate?

The U.S. Department of Energy expects the Consortium to expand its initial membership to include non-U.S. based coal and coal-fueled electricity companies. Non-U.S. based equipment and service vendors may participate in FutureGen through the competitive selection process for their goods and services. The FutureGen project will be located in the United States. For all other aspects of the project, the Department's goal is for the Consortium to be organized such that U.S. and non-U.S. based organizations are treated equivalently.

What are the Benefits to Non-U.S. Based Industrial Organizations?

The definitive cost, performance, and environmental data produced by FutureGen will give non-U.S. based industrial organizations the ability to:

- Develop and understand options for coal-fueled power and hydrogen plants using zero emissions technologies

- Reduce the cost of meeting possible future limits on carbon emissions
- Have fact-based information to help shape public policy and regulations related to carbon capture and storage
- Evaluate early-stage investment opportunities in carbon capture and storage technologies, and technologies to produce hydrogen from coal
- Establish coal as a viable, reliable indigenous source of produced hydrogen for the transportation sector

How Will Intellectual Property Be Handled?

The U.S. Department of Energy will work with the founding members of the Consortium to develop intellectual property provisions that balance the competing needs of the various entities participating in FutureGen. Guiding principles will be:

- All intellectual property arrangements involving domestic and foreign technology providers should be structured to maximize the potential to commercialize the technology being developed and
- Sufficient non-proprietary data on the engineering, environmental, and cost performance of FutureGen must be made publicly available to enable all interested parties to evaluate the viability of coal-fueled, zero emissions energy plants

What Role Can Developing Countries Play in FutureGen?

By 2020, more than 60 percent of all anthropogenic greenhouse gas emissions are expected to come from developing countries. Thus, it is important to maximize opportunities for participation of these nations in FutureGen. Participants from developing countries may have opportunity to participate by bringing scientists and researchers to engage in research including test observations, assistance in actual tests, data collection and analyses.

A number of funding organizations have missions that are consistent with FutureGen goals. The U.S. Department of Energy plans to approach these organizations to request funds for participation in, or observation of, the FutureGen project by governmental or nongovernmental organizations from developing countries. Organizations that are potential sources of funding include:

- U.S. Agency for International Development (USAID)
- United Nations Industrial Development Organization (UNIDO)
- United Nations Environment Programme (UNEP)
- United States Asia Environmental Partnership (USAEP)

- U.S. National Science Foundation (NSF)
- Non-U.S. agencies for economic development
- World Bank
- International Energy Agency
- Global Environmental Fund
- Regional Development Banks

Where Can Additional Information on FutureGen Be Obtained?

The FutureGen program is in the process of being developed. As additional information becomes available, it will be posted on the U.S. Department of Energy's Fossil Energy Website *at http://www.fe.doe.gov*. The following Department officials can be contacted for more information regarding FutureGen:

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